DOCUMENT RESUME

ED 407 387 SP 037 303

AUTHOR	McCrea, Linda D.
TITLE	A Review of Literature: Special Education and Class Size.
SPONS AGENCY	Michigan State Board of Education, Lansing.
PUB DATE	30 Sep 96
NOTE	32p.
PUB TYPE	Information Analyses (070)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Academic Achievement; *Class Size; Disabilities; Educational Policy; Educational Research; Elementary Secondary Education; *Small Classes; *Special Education; Special Education Teachers; State Regulation; *Teacher Student Ratio

ABSTRACT

This review has two parts: the first concerns class size and general education; the second, class size and special education. The general education review is in four sections: (1) foundational class size research; (2) critiques of the foundational works; (3) extended research; and (4) five studies in class size research conducted by states. The second part (on special education) reviews representative samples from an ERIC search of approximately 387 articles. These studies were: a national survey conducted by the University of Minnesota (1989) to document student to teacher ratios; also at the University of Minnesota (1993) an investigation of ratios of less than 15:1; a study conducted by the Virginia State Department of Education (1994) on special education program standards; another study in Virginia (1993) that investigated whether class size and class mix influenced educational outcomes; a New York State Education Department study to evaluate the impact of larger class size on those involved in the special education delivery system; and a study of individual caseloads. The review of these special education studies found that: (1) the maximum student to teacher ratio in special education is usually 15:1; (2) students are generally grouped by academic performance, not by their educational and management needs; (3) smaller classes provide better environments for learning, especially at the elementary level; (4) student achievement and behavior are affected by class size; (5) class size is impacted by other variables, including use of paraprofessionals and teacher experience; and (6) there is no one best teaching methodology to assure students success. (Contains 36 references.) (JLS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 407 387

A REVIEW OF LITERATURE:

SPECIAL EDUCATION AND CLASS SIZE

Linda D. McCrea

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

September 30, 1996

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

"This document was produced through an IDEA State Initiated Grant for Special Education Delivery Systems Task Force awarded by the Michigan State Board of Education. The opinions expressed herein do not necessarily reflect the position of policy of the Michigan State Board of Education or the U.S. Department of Education, and no endorsement is inferred. This document is in the public domain and may be copied for further distribution when proper credit is given. For further information or inquiries about this project contact Judy M. Hazelo at the Office of Special Education Services, P.O. Box 30008, Lansing, Michigan 48909."

SP037303

BEST COPY AVAILABLE

There has been considerable controversy and debate in the field of education surrounding the issue of optimum class size. Many teachers have the belief that smaller class sizes are better, provide a higher quality educational environment, and promote greater student learning (Filby, Cahen, McCutcheon, & Kyle, 1980; Albritton, 1984; Pate-Bain & Achilles, 1986; Folger, 1989; Johnston, 1989; Nye, Boyd-Zaharias, Fulton, & Wallenhorst, 1992). Parents hold similar beliefs. They value the perceived benefits of smaller classes, as evidenced by the number of parents who send their children to private schools, where classes are perceived to be smaller, individual attention is seen as the norm, and children appear to enjoy school more (Filby, et al., 1980). Boards of education, school districts, and administrators state there is no conclusive evidence (empirical data) to support the reduction of class size and its supposed benefits. If evidence did exist these groups cite the lack of funding to pay for the additional staff and space that would be required in order for full implementation to occur (Pate-Bain & Achilles, 1986). Since research can be manipulated to support either point of view, the controversy continues.

Why then another paper on class size? Simply, the effects of class size have been examined extensively in the general education literature, however the same does not hold true for special education. There is a paucity of class size research specific to special education classrooms. What limited research is available "indicates that students learn better at a teacher to student ratio of one to one-a ratio school districts cannot afford, yet a finding they cannot ignore" (Patriarca & Stewart, 1995, p. 1).

Since school administrators must be fiscally accountable, they need to make sound financial decisions that offer the most educational benefit for all students, yet continue to change programs to prepare them for the next century. Major shifts in expectations for the education of students with special needs and for their success as adults have occurred during the last twenty

plus years throughout this country, as well as in the state of Michigan. These shifts have placed "great stress on this state's 'seventies' style structure" and have caused its State Board of Education to undertake a major revision of special education (Michigan Department of Education, 1996. p. i). Some factors which contributed to the Board's decision to undertake this revision are: (1) "an increased awareness of new and best practices, and the interaction of special education and general education in a unified system of public education, (2) the need to align state and federal standards for special education, and (3) a perceived fiscal crisis in the public schools" (Office of Special Education Services, 1994, p. 2).

To accomplish this task in a comprehensive, futuristic manner, the Board established a Special Education Delivery Task Force (Task Force). The Task Force was given the charge to make "...recommendations for a restructured special education delivery system ...of highest quality for students with disabilities.... in harmony with Michigan's moral and constitutional responsibility to provide such an educational opportunity for all its citizens ..., [that] recognizes the finite limitations of resources and ... [which] will be relevant and functional into the twenty-first century" (Michigan Department of Education, 1996, p. i-ii).

The Task Force's report made recommendations in eight distinct areas. One of the recommendations stated that a comprehensive study of teacher caseload maximums for special education teachers, instructional support, and consultants based on research and "best practices" should be initiated. (Michigan Department of Education, 1996). Thus another paper on class size, that has as its purpose to review, summarize, and analyze the literature (general and special education) specific to optimal class size and/or caseload; the effect of class size on student performance; and "best practices" associated with increased student learning.

Review of the Literature

General Education

This review of the general education literature will provide information from various sources focusing on the different aspects of class size and its implications. The review has been subdivided into the following sections:

1. Classic class size research: The foundational works (1970's);
2. Critiques of the foundational works;
3. Extended research pertaining to class size; and
4. Studies in class size research conducted by states resulting in various state initiated projects.

Class size research: The foundational works. Glass and Smith in their 1979 study found that small classes provide for: greater teacher knowledge of students; better student/teacher interaction; greater variety of instructional activities; more small group work; greater teacher directiveness; more positive teacher control; more creative instruction; greater frequency of conferencing with parents; more material was covered; more positive evaluations and feedback; better use of space; and better quality of instruction.

In 1980, Smith and Glass conducted an additional study, a meta-analysis of research on class size and its relationship to attitudes, achievement, and instruction. This was a companion piece to their earlier work. Their first work "identified 80 studies and translated their separate results in a common metric" (Smith & Glass, 1980, p. 419). When the results were summarized, a relationship between class size and achievement was clearly evident. This particular article,

using the same type of analysis, coded the features of 59 studies and 371 findings were then transformed into a common metric for statistical integration. This data revealed relationships between class size, teacher and pupil attitudes, and instruction. There were three specific types of effects that surfaced. First, the positive effects on teachers: workload, morale, and attitudes toward students. Second, the affective (positive) effects on pupils: self-concept; interest in school; and participation. And third, the effects on instructional environments and processes: greater attempts to individualize instruction and better classroom climate (Smith & Glass, 1980). These researchers state that the greatest class size effect was for pupils 12 years and under and the least effect for those 18 and over. Thus class size does interact with pupil age. They conclude by stating that "reducing class size has beneficial effects both on cognitive and affective outcomes and on the teaching process itself" (Smith & Glass, 1980, p. 432).

Critiques of the foundational works: Once Smith and Glass' results were published organizations and individuals around the country interpreted these findings to mean that smaller class sizes *always* resulted in higher achievement. Due to the possible far reaching implications, in 1980, the Educational Research Service (ERS) conducted a critique of the authors' meta-analyses. Their goal was to critically examine these authors' methodology, findings and implications, rather than to prove or disprove the case concerning class size.

ERS uncovered that the major findings of the meta-analysis were not based on all the reviewed studies but only on 14 viewed by the authors as being "well controlled." ERS also noted that a substantial number of the comparisons on classes below 20 involved one-to-one tutorial situations and classes of 2-5 pupils. Thus providing a rather skewed view of how regular classrooms actually operate.

4

The basic findings ERS reviewed in the second meta-analysis (Smith & Glass, 1980) revealed that of the 60 studies examined, 12 (or 20%) dealt with students 19 years or older. Moreover, many of the comparisons were based on very small or very large pupil/instructor ratios. Specifically, 20% of comparisons based on large classes of 50 or more while 34% of comparisons based on small classes of 10 or less. Not depicting the typical sized classrooms found in schools throughout the country.

ERS summarized its findings by stating: (1) the meta-analysis method used by Smith and Glass homogenized the data and thus made it impossible to draw meaningful conclusions; (2) the findings of these meta-analyses rest on fewer studies than previous reviews and are not the "best representation of class-size and achievement relationship; (3) the conclusions presented confuse the class size issue and do not support the assertion that smaller classes are better under any circumstances, either in terms of student achievement or the quality of education; and (4) by drawing bold generalizations when only cautious and qualified conclusions were supportable, the authors create doubts about the need for conducting further research into class size issue.

In addition, ERS found "nothing to change its conclusion that few pupil benefits can be expected from reducing class size if teachers continue to use the same teaching methods in smaller classes that they used in larger classes" (ERS, 1980). A study completed by Filby, Cahen, McCutcheon, and Klye (1980) supports the ERS position. These authors discovered that teachers did not individualize instruction more in smaller classes, even when class sizes were lowered and they were encouraged to do so.

With these two conflicting positions in the literature, class size again became an issue that required further study. It also provided school boards, school districts, and administrators with data to refute teachers and parents who desire smaller classes for their students.

Extended research pertaining to class size research.

In 1990 Robinson wrote an article which extended the work begun by ERS and addressed the question: Does research support the expectation that smaller classes will improve learning? His purpose was to investigate the accumulated findings in class size studies that were consistent and meaningful by using a cluster analysis approach. There were 100 studies between 1950 and 1985 in K-12 classes containing five or more students. The studies which met the criteria were then grouped into "clusters considered important for class size decisions, such as grade levels, subject areas, student characteristics, student achievement, student behavior, and teaching practices" (Robinson, 1990). The results of the analysis were that the:

- most promising effects of class size reductions occur in grades K-3;
- research provides little support that decreasing class size will by itself improve student learning;
- most positive effects on pupil learning occur in grades K-3 in reading and mathematics, particularly in classes of 22 or fewer students;
- studies which examined student attitudes and behavior found the most favorable effects of smaller classes in primary grades;
- smaller classes can positively affect academic achievement of economically disadvantaged and ethnic minority students;
- midrange within 23-30 pupils, class size has little impact;

- little increase if any in pupil achievement can be expected from reducing class size if teachers continue to use the same instructional methods and procedures in the smaller classes that they used in larger classes;
- reductions in class size have small positive effects on achievement in comparison to many less costly learning interventions and strategies;
- research indicates that class size reductions should be targeted to specific groups of pupils for specific purposes;
- and that teachers should receive training and resources they need to make the most of the learning opportunities in smaller classes.

Using the available class size data, states began investigating the effects of reducing class size and piloting state initiated projects. The following studies are summarized to illustrate these current efforts.

Recent studies in class size research conducted by various states.

Study 1: California and Virginia. A group of researchers (Filby, et al., 1980) collaboratively conducted a study involving teachers in two states, California and Virginia. Their purpose was to describe changes in instructional processes and in teacher and/or student behavior when class size was reduced by one-third midway through the school year. A repeated-measure design was used. In each of four second-grade classes, class size was reduced midway through the year by removing one-third of the children in each class to a newly created class. The four classes were studied throughout the school year, in both the "large" class and "small" class phase for comparison purposes (Filby, et al., 1980).

Two schools participated, with two second grade classrooms in each school. Virginia's rural school reduced two second grade classes of 20 students to three classes of 13 during January. California's inner city school, class size began at 35 and was reduced to 22, also during the month of January.

The researchers found that when class size was reduced changes occurred. The findings were: (1) classroom management seemed easier and more effective, fewer discipline problems; and (2) teachers could individualize, spend more time with individual students. Some additional findings uncovered were: student attention rates were higher; curriculum, teachers were spending more time directing group lessons and more work was being accomplished; greater opportunities for enrichment activities and greater depth in reading and math; provided students with more immediate feedback and encouragement; and teachers' reactions were favorable, they were more relaxed, felt good about what he/she was able to do and knew more about how each student was performing (Filby, et al., 1980).

The researchers made a point to state that "these changes were not necessarily caused by the class size reduction" (Filby, et al., 1980, p. 5). Since the reductions came in midyear, maturity of the students may have impacted the results, as well as the fact that teachers by midyear had more time to establish classroom procedures. The group also responded by saying "that none of the changes reflected major additional effort on the part of the teacher" (Filby, et. al, 1980, p. 15). Perhaps lowering the number of students allowed the teacher to do more and better of what he/she was already inclined to do. However, looking at this fact from an opposite perspective, researchers might conclude that no change would occur if teachers continue to use the same materials and procedures after classes were reduced. Teachers may not have the

pedagogical skills to do a better job of teaching or they may continue doing what he/she has always done regardless of the class size.

Study 2: Texas. In 1984, the Texas legislature mandated a 1:22 maximum teacher to student ratio in grades K-3 to be accomplished over a 5 year period. By 1988, the average class size for K-2 was 20 to 21 students per teacher which was approximately 26% decrease per classroom (Duggan, 1990).

Student scores on Texas' state skills test (TEAMS) have risen 15% for students tested in the third and fifth grades within the first three years of the mandate. The state can statistically validate across Texas, that by lowering class size at the early grade levels had a significant, positive impact on student achievement (Duggan, 1990). During this time Texas had to come to grips with the following issues: costs (districts passed bond issues plus additional state moneys); defining class size (number of students assigned to each teacher, excluding special area teachers and support personnel); change in teacher behavior (mandated teacher/administrator training in effective teaching practices); grades which would benefit the most (research shows significant achievement 15:1); and how to implement.

Texas believes that by taking into consideration all the reforms that have been put into place, the most significant was to set class size maximums at the early grade levels. A piece of advise from Texas to the other states as to the size of classes: "pick your own number--as long as its lower" (Duggan, 1990, p. 6).

Study 3: Indiana. Researchers investigated the effects of Indiana's project *Prime Time* on reading and math achievement test scores of second graders who had completed two years of a state supported class size reduction program (McGiverin, Gilman, & Tillitski, 1989). This

project was initiated by the Indiana State Department of Education and based on a two-year investigation of the effects on achievement test scores of reducing the student to teacher ratio to 14:1 in twenty four K-2 classes. After one academic year (two semesters) these students' higher reading and math scores were encouraging enough for the state of Indiana to implement the state-wide project *Prime Time*. With an average class size of 18 students, the project began with first grade classes in 1984-85. The second grade classes were added in 1985-86, third grade in 1986-87, and at the beginning of 1987-88 class sizes for grades K-3 were all reduced.

The results of 10 studies (24 comparisons) of *Prime Time* small classes, averaging 19.1 students and pre-*Prime Time* large classes averaging 26.4 students were significant. On the basis of these findings, the researchers concluded "that second-grade students in smaller classes (19.1 students as defined by project *Prime Time*) had significantly higher achievement test scores than did students in larger, pre-*Prime Time* classrooms" (McGiverin, et al., 1989, p. 54). This equaled an average increase of approximately six points in each of the studies.

The research group issued cautions concerning the relationship between class size and achievement. Additional investigations are required to support the consistency of results. Further research efforts should focus not only on the amount of students in a classroom, but what do teachers do and what do students experience in smaller classes, as well as long-term effects of *Prime Time* (McGiverin, et al., 1989).

Study 4a: Tennessee. The state of Tennessee's Student/Teacher Achievement Ratio (STAR) Project began in 1985. Based upon the governor and the state legislative body's comprehensive educational reform (Better Schools Program), a small study conducted by Tennessee State University of one metropolitan Nashville school, and an expansion of Indiana's

Prime Time project, the legislature funded a major study to consider the effects of class size on students in primary (K-3) grades with enough appropriation money for a four-year study (Word, et al., 1990).

This huge undertaking involved 79 schools and investigated the following questions required by the state legislature. First, what are the effects of a reduced pupil-teacher ratio (13-17 to 1) on the achievement and development of students in grades K-3? Second, is there a cumulative effect of being in a small class over an extended period of time as compared with a one year effect? And third, does a training program designed to help teachers take maximum advantage of small classes or to use aides effectively improve student performance when compared to teachers with no special preparation?

There were 79 schools in 42 school districts including: 38 rural; 17 inner city; 16 suburban; and 8 urban schools which participated during the first year. "In 1985-86, the project had 128 small classes (approximately 1,900 students), 101 regular classes (approximately 2,300 students), and 99 regular classes with teacher aides (approximately 2,200 students)" (Word, et al., 1990, p. 6). Scores from Stanford Early School Achievement Test II for kindergarten, various forms of the Stanford Achievement Test (SAT) and Tennessee's Basic Skills First (BSF) curriculum-based, criterion-referenced tests were administered to first through third graders to gather academic achievement data (Pate-Bain & Jacobs, 1990).

By using both statistical and educational measures, students in small classes (15:1) made significantly greater gains, than those in regular size classes, as well as those students in regular size classes with full-time aides (Pate-Bain & Jacobs, 1990). Researchers analyzed the data and reported that data confirmed "that small class effect, while not immense, is found in two basic

subject areas, at three grade levels, and in all four school settings" (Pate-Bain & Jacobs, 1990, p. 3). Further analyses revealed that: (1) students with low socioeconomic status achieved their highest scores in small classes and their lowest in regular size classes; (2) students who attended class more than 90% of the time achieved better scores than students present less often in all three types of classes; (3) students in small classes who attended 90% of the time showed the greatest gain; (4) rural classes obtained the highest SAT and BSF scores; (5) greatest gains in the SAT were made by inner city small classes; (6) students who were not eligible for free lunch performed better than those who were eligible; and (7) teachers felt that they were better able to identify student needs, to provide one to one attention, and to effectively cover more material (Pate-Bain & Jacobs, 1990; Pate-Bain, Achilles, Boyd-Zaharias, & McKenna, 1992).

The data collected support the conclusion that student achievement is at least mildly linked to class size reduction (Mitchell, Beach, & Badarak, 1989). Even though the effect of a small class increases from kindergarten to first grade, beyond first grade there is no cumulative effect and no evidence that the effects of reduced class size will hold over all grades. One study suggests that the most cost effective measure would then be to limit class size in kindergarten and first grade (Folger & Breda, 1989).

There have been many articles written in different journals concerning the STAR project. These articles have presented selected pieces of the original data in various configurations. Articles have dealt with student performance in mathematics and reading during the primary grades (Finn, Fulton, Boyd-Zaharias, & Nye, 1986; Finn & Achilles, 1990; Johnston, 1990); effective teaching practices and teaching practices in regards to class type assignment and training conditions (Evertson & Randolph, 1989; 1990; Pate-Bain & Jacobs, 1990; Word, et al.,

1990; Nye, Boyd-Zaharias, Fulton, & Wallenhorst, 1992); teachers' perceptions (Johnston, 1989; Finn & Achilles, 1990; Pate-Bain, et al., 1990); and the summarizing of possible effects (Folger, 1986; Pate-Bain, et al., 1992).

These articles all tend to be very positive. The overriding theme in each is that student achievement is at least mildly linked to class size reduction. However there are some issues which need to be remembered from the STAR research. First, that any reduction in class size will increase per pupil cost. Second, that just changing class size without changing what is taught or how it is taught will probably only have modest results. Third, that there were a variety of factors that influenced student achievement, for example teachers believed they could do a better job teaching in a smaller class and did so. And fourth, that reducing class size should only be a part of an overall strategy for improving student achievement (Folger, 1989).

Study 4b: Tennessee. Project STAR data provided the basis for a four-year longitudinal study entitled, *The Lasting Benefits Study* (LBS) of students in fourth and fifth grades who benefited from small class sizes in K-3 (average of 15:1) and returned to regular size classes (average 26:1) for these later grades. The LBS analyzed pupil test scores and behavioral indicators of school efforts using the Tennessee Comprehensive Assessment Program (TCAP). The fourth grade analysis included 4230 pupils and 4976 pupils in fifth grade (Achilles, 1993).

The results are consistent. Students in fourth and fifth grades previously in small size classes demonstrated that they had statistically significant advantages over students previously in regular size classes and students in regular size classes with an aide on every set of measurement utilized (Achilles, 1993). Even those students who were in STAR small classes in only grade

three were statistically and educationally ahead of other students (Nye, et al., 1992). The greatest achievement in the fourth grade were for inner city and suburban classes.

According to Achilles (1993), "the positive effects from early involvement in a small size class still remained pervasive two full years after students returned to regular size classes" (p. 4). These STAR results demonstrate that, at a minimum, class size should be reduced significantly during the primary years. Class size reduction is a restructuring process. The STAR research offers strong recommendations that restructuring should begin with small groups of students in at least K-1 or K-2. Education excellence must certainly begin somewhere. Small classes provide a new basis from which educators can work (Achilles, 1993).

Study 4c: Tennessee. In keeping with this philosophy, Tennessee's Department of Education began a program, *Project Challenge*, to reduce at-risk teacher to student ratio in kindergarten through third grade classes in 17 rural school systems (15:1 approximately). Students' scores from the TCAP were compared with students from Tennessee's 138 school systems. From 1990-1991, results showed that 9 of the 17 improved their ranking statewide in reading and 10 *Project Challenge* systems demonstrated considerable improvement in statewide student rankings in mathematics. The authors realize and so state that this study should be of a continual nature in order to document the effects from reduced class size and related school practices on student achievement (Nye, et al., 1992).

The results of Indiana's *Prime Time* and Tennessee's Project STAR have been disputed in the literature (Sanogo & Gilman, 1994). These particular authors investigated the methodologies, designs, and circumstances of both projects, stating one was not conducted any better than the other. As is the case with most research, data were manipulated to continue the

controversy surrounding the issue of class size. The state of Tennessee, however is taking Project STAR's findings seriously by mandating classes of 17 in grades K-3 by 2002 and is providing funding to support its mandate (Bracey, 1995).

Study 5: Wisconsin. The state of Wisconsin established a Task Force that listened to the concerns of the citizenry and recommended changes in the educational system. The primary charge was to determine ways to help students attending urban schools. Their recommendations focused on the process of teaching and learning that would guarantee *all* Wisconsin children had the opportunity for high levels of academic achievement (Molnar & Zmrazek, 1994).

The specific recommendations were to: reduce class size to 15:1 in K-5 grades and 15:1 in core subjects in grades 6-8; open every school from early morning until late in the day to serve students, families, and the community (education, recreation, and other services); develop curriculum that reflects the diversity of this country; and create a system of professional training and education to ensure that professionals have the skills required to teach *all* students (Molnar & Zmrazek, 1994).

As an incentive the state department would: pay the cost of salary and fringe benefits for each additional teacher necessary to maintain appropriate ratios; appoint a task force to collaborate with service providers and coordinate existing services that help children and families; provide technical assistance to aid in developing curricula; and facilitate the collaboration of school districts, colleges and universities in planning and implementing staff development programs (Molnar & Zmrazek, 1994).

Class size reductions will be phased in over an eight year period. The first year of the project will be 1996-97 and participating districts must agree to a 15:1 student teacher ratio for

K-1 grades. A grade per year will be added to the program until it is fully operational in all K-5 and in all core subjects in grades 6-8. This project is currently being implemented

Summary

The previously mentioned projects all have the same goal - to improve education for their children. Based upon previous research studies, each of the states decided to lower class size, however each chose a different teacher student ratio. All discovered that there is a cost factor and it is usually more than lowering the amount of students per room, but rather what teachers do in those rooms and how students react to it.

From general education to special education

Research has not shown any direct correlation between general education class size findings and special education class size findings. One reason is that there has been considerably less class size research conducted in special education than in general education. And secondly, to complicate the situation further, special education classrooms have differing combinations of students and "count" students differently.

General education uses the term *class size* which refers to the number of students a teacher is instructing at a time. However, special education often uses the term *caseload* which refers to the total number of students for whom a teacher has some degree of responsibility. Interestingly enough, Great Lakes Area Regional Resource Center (GLARRC) in 1995 interviewed state education administrators by asking questions specific to class size and caseload. There were 38 states contacted and 35 responded. Of those who responded, 22 regulated caseloads and 13 did not. The primary answers were that caseloads were determined by individual districts or by the degree of severity of the students. It was found that only 8 states

regulate class size. From those 8 came the following criteria for determining class size: (1) districts make that decision; (2) based on the students' individualized education plan (IEP); and (3) based upon the severity of the students' impairment. In addition one state limits special education classrooms either 8:1 or 12:2. Others vary from 20:1 in regular education classrooms and 3:1 - 15:1 in special education classrooms. A definite lack of consistency is apparent.

The very nature of special education is such that students are there to receive "specialized" help in order to succeed academically, therefore special education classrooms tend to have a wide range of ages and abilities. Because of these factors, special education classes tend to have much lower teacher student ratios than general education. So would a reduction in class size/caseload have a statistically significant impact on students' achievement who are placed in special education classes? Or as in general education would teachers do more and better of what they were already inclined to do?

Special Education

Smaller special education classes and specialized instruction have been the basis for meeting the needs of students with disabilities for decades. Recently with "the current interest in deciding where best to serve students with special learning needs, concern for the uniqueness and effectiveness of special education instruction has increased as well" (Thurlow, Ysseldyke, Wotruba, & Algozzine, 1993, p. 306). However, little research has been conducted that demonstrates benefits actually exist in smaller special education classes. After conducting an extensive ERIC search of approximately 387 articles, a few studies of class size in special education surfaced. The following are the best representative samples currently available.

Study 1: University of Minnesota (1989). A national survey of special education teachers was conducted to document current student to teacher ratios and instructional arrangements used for students with mild disabilities (Ysseldyke, Thurlow & Wotruba, 1989). This study determined students with mild disabilities to be those who received some instruction in a general education classroom. Both elementary and secondary teachers responded. The average student to teacher ratio was 4.7:1, with a range of 1:1 to 15:1. Most students were grouped by academic performance levels. A large number of teachers surveyed were not familiar with local district guidelines for teacher student ratios and caseloads. Forty-two percent either did not know or left the item blank. This study is limited "by the nonrandom selection of respondents, results point to the diversity of practices and the ambiguities that currently exist in special education regarding student-teacher ratios for students with mild handicaps" (Ysseldyke, Thurlow, & Wotruba, 1989, p. 102).

Study 2: University of Minnesota (1993). Thurlow, Ysseldyke, Wotruba, and Algozzine (1993) conducted this study to investigate ratios of less than 15:1; ratios that reflect current practices in special education classrooms. The subjects were 139 students with mild handicaps in grades 1-6. Within this group were 91 males and 48 females who were categorized as learning disabled (LD), emotionally/behaviorally disordered (E/BD) or educable mentally retarded (EMR). There were 27 schools used in eight school districts. Observations were conducted during each student's scheduled special education time (30-60 minutes). Each student was observed once over a 12 month period.

Trained observers collected all the data. Observations were gathered using a measure of instruction and student responding and an instructional environmental scale. The Code for

Instructional and Student Academic Response (CISSAR) was implemented. This instrument was designed to provide information on time spent on various subjects (reading, math), tasks (text or workbook), physical structures (individual, group), instructional structures (independent activities), and responses (written, reading, looking around).

After observing and administering the CISSAR students and teachers were interviewed. The observer then completed the Instructional Environment Scale (IES) consisting of 40 descriptive statements about the instruction a student receives.

Composite scores and other classroom characteristics that reflect instruction variables were compared as a function of teacher to student ratios (1:1; 3:1; 6:1; 9:1; and 12:1). Results showed that the lower the ratio of students to teacher the higher the value of items measured on the CISSAR.

"Although results indicate that class size may affect some special education classrooms positively we know nothing about the impact of student learning because no achievement data were gathered" (Patriacra & Stewart, 1996, p. 6). The researchers conclude by stating results suggest: "that smaller classes may provide better environments for instruction and student responding; however, additional research is needed to clarify the specific nature of these benefits and their generalizability across categories of exceptional students" (Thurlow, et al., 1993, p. 313).

Study 3a: Virginia. Virginia's Department of Education (1994) conducted a study which had as its purpose to investigate the state's current special education program standards. Two of the standards and their subsequent findings were pertinent to this article, since they specifically dealt with the issue of class size. Relative questions asked were: What is the effect

of varying class size? and What is the effect of varying class mix (categorical placement of students with disabilities)?

During the study's first phase Virginia piloted ways to gather the necessary information using interviews, document reviews, observations, and surveys. The second phase of the study gathered a broader base of information by surveying: all the state's special education directors; 1,000 randomly selected special education teachers of students with mild disabilities (EMR, E/BD, & LD); over 3,000 other special education teachers of students with moderate and/or severe disabilities (hearing, vision, speech/language and preschoolers); and through public hearings held, state-wide testimonies and written comments were obtained.

Since the methods used were not fully explained, the following findings should be viewed with discretion and caution (Keith, Keith, Young, & Fortune, 1993). Effects of class size on student progress showed: (1) students with EMR, E/BD and LD in larger classes achieved at a lower level than students in smaller classes and that the area of reading was affected more adversely than mathematics achievement; (2) larger classes adversely affected elementary students more than secondary students; (3) the effects were the same for students in resource rooms or in self-contained settings; (4) that class size affected students with EMR, E/BD, and LD about the same; and (5) teachers reported using an equal variety of teaching methods in large and small classes alike.

Effects of class mix on student progress showed: (1) mixing students with EMR, E/BD, and LD had not obvious effect on their levels of self-concept, work habits, motivation, aspirations, or interpersonal skills, and (2) mixing students with EMR, E/BD and LD in the same class had no obvious effect on students' academic achievement. However, this particular finding

is disputed in the literature. Keith, Keith, Young and Fortune (1993) report that their study on the aspect of class mix, pointed out a contradiction. They found that students in single disability classes appear to have higher reading, math, and social studies achievement than students who are mixed with other disabilities.

From this investigation of Virginia's program standards nine recommendations emerged. Six of the recommendations dealt specifically with caseloads and/or the class size of students with various disabilities. One recommendation requested that students with EMR who receive 50% or more special education services have an 8:1 student teacher ratio and 10:2 when a paraprofessional is in the classroom.

Study 3b: Virginia. Keith, Keith, Young, and Fortune (1993) studied students with LD, B/ED, and EMR to determine if class size and class mix influenced educational outcomes. Twelve classrooms containing 110 students comprised the research sampling, which included classes with waivers (classes out of compliance with Virginia standards) for class size and class mix; waived classes with LD, B/ED and EMR students; and classes in compliance with Virginia standards. Qualitative and quantitative results were used as educational outcomes and were obtained in four academic achievement areas and nine affective areas.

Data revealed that student achievement is affected by class size. The authors stated that: (1) lower academic achievement occurred in large special education classes in reading, math, and social studies; (2) students in categorical (single disability) classrooms achieved higher in reading, math, and social studies than students who were mixed with other disabilities; (3) students in non-waivered classes were making more progress on their educational goals and had better behavior than students in waivered classes; (4) teaching methods were not significantly

different; and (4) there was no difference in waivered and non-waivered classes on students' self-concept, motivation, time on task, or educational aspirations (Keith, et al., 1993).

The Virginia studies underscore the differing viewpoints between researchers, as well as between directors and special education teachers about mixing students with disabilities in the same classroom. Directors are in favor of mixing students, however teachers do not support this position and believe that by mixing classes the quality of instruction will decrease.

Study 3: New York. New York State's Board of Regents had begun to allow districts to increase the maximum class size for special education students from 12:1 to 15:1 and to include another class size option with 8 students to one teacher and one paraprofessional. Following this action, New York State Education Department contracted with MAGI Educational Services, Inc. to conduct a research study to evaluate the impact of class size change on students, teachers, related services personnel, parents, and the special education delivery system.

MAGI's evaluation actually contained two separate studies. The first was a descriptive study which investigated the perceptions of teachers, students, parents, and administrators and also reviewed student records. Data were collected from 17 randomly selected districts in New York State which chose the 15:1 class size option and 10 randomly selected New York City community school districts. Key findings were: special education directors and chairpersons supported the change, teachers did not; effects on students according to elementary teachers were negative, but secondary teachers reported some small benefits; and that parents were not aware of an increase in the number of students in their children's classes, but those who were aware were significantly more concerned about their child's education.

The second study by MAGI was experimental in nature and investigated special education's instructional processes (student and teacher behavior) in 12:1 and 15:1 classes. The purpose was to measure the time students spent academically engaged, since time on task is linked with student achievement, according to research findings (MAGI, 1995). Instruments used to gather data were the same as those used in the Minnesota study (Thurlow, et al., 1993). The major finding was that a larger class size at the elementary level was associated with less time spent on student academic behaviors, and more time spent on student acting out behaviors. The differences were greatest when the class size was less than 9 or more than 13. No significant results at the secondary level were noted due to the small sample sizes.

Several conclusions can be drawn from New York's class size research study: (1) that class size is a significant factor related to student and teacher behaviors at the elementary level, with increasing class size bringing decreased academic engagement time and more student acting out behaviors; (2) that districts should keep several class size options and base student placement decisions on educational and management needs; and (3) that class size is impacted by other variables such as, appropriate student placement/grouping, use of paraprofessionals, a smaller range of academic functioning levels in the classroom, and teacher experience (MAGI, 1995).

Study 4: Caseloads. This was the only study found that dealt specifically with caseloads of special education teachers. Algozzine, Hendrickson, Gable, and White (1993) examined and compared the caseloads of teachers of students with serious emotional impairments/behavior disorders across states. The number of these students per teacher ranged from 3:1 to 35:1 with an average caseload of 12.14. The researchers also completed an evaluation of hypothetical relations between caseload and predicted student achievement which showed that predicted

achievement decreased as caseloads increased (in z-score units). Their findings are limited in nature.

Summary

The special education studies concerning the issue of class size had the same goal as their counterparts in general education research - to improve education for children. These studies found that: (1) the maximum student to teacher ratio in special education is usually 15:1; (2) students were grouped by academic performance, but should be placed in a class based on their educational, as well as their management needs; (3) smaller classes provide better environments for learning, especially at the elementary level; (4) student achievement and behavior are affected by class size; (5) class size is impacted by other variables, including the use of paraprofessionals and teacher experience; and (6) there is no one best teaching methodology to assure students' success.

Conclusions

Class size continues to be an extremely complicated issue for general educators, special educators, and administrators. There was no magical student to teacher ratio which materialized for either type of classroom (general or special education), other than smaller would probably be better and would have a cost factor attached. But one group of researchers stated: "providing the best possible education environment is either an expensive proposition--or a wise investment in children" (Nye, et al., 1992, p. 33).

It also became apparent that it is not merely the size of the class which is important, but what teachers do with smaller groups. Reductions must be accompanied by a change in teaching practices. Throughout the literature review process, no "best practice" emerged. However, smaller classes positively affect teachers' classroom attitude and behavior, thereby providing them with more opportunities to implement various instructional strategies that research suggests can raise student performance (Odden, 1990).

Based upon this research, there are educational advantages to smaller classes, as well as instructional benefits for general education and special education students alike. Informed decisions which will determine class size are now the responsibility of the Michigan Department of Education.

REFERENCES

Achilles, C.M. (1993). The lasting benefits study (LBS) in grades 4 and 5 a legacy from Tennessee's four-year class-size study (1985-1989), Project STAR. Paper presented at the Annual Meeting of the North Carolina Association for Research in Education. Greensboro, NC

Albritton, T. (1984). A review of recent literature on the effects of class size, with implications for English and language arts instruction. Florida State University. (ERIC Document Reproduction Service No. ED 248 517)

Algozzine, B., Hendrickson, J.M., Gable, R.A., & White, R. (1993). Caseloads of teachers of students with behavioral disorders. Behavioral Disorders, 18(2), 103-109.

Bracey, G.W. (1995). Research oozes into practice: The case of class size. Phi Delta Kappan, 76, 89-90.

Duggan, B. (1990). Real issues and false assumptions about class size. Streamlined Seminar, 9(1), 5-9.

Educational Research Services. (1980). Class size research: A critique of recent meta-analyses. Arlington, VA: Educational Research Service.

Evertson, C.M. & Randolph, C.H. (1989). Teaching practices and class size: A new look at an old issue. Peabody Journal of Education, 67(1), 85-105.

Filby, N., Cahen, L., McCutcheon, G., & Kyle, D. (1980). What happens in smaller classes? A summary report of a field study. San Francisco, CA.: Far West Laboratory for Educational Research and Development.

Finn, J.D. & Achilles, C.M. (1990). Answers and questions about class size: A statewide experiment. American Educational Research Journal, 27, 557-577.

Finn, J.D., Fulton, D., Zaharias, J., & Nye, B.A. (1989). Carry-over effects of small classes. Peabody Journal of Education, 67(1), 75-84.

Folger, J. (1989). Project STAR and class size policy. Peabody Journal of Education, 67(1), 1-16.

Folger, J. & Breda, C. (1989). Evidence from Project STAR about class size and student achievement. Peabody Journal of Education, 67(1), 17-33.

Glass, G.V. & Smith, M.L. (1979). Meta-analysis of the research on class size and achievement. Educational Evaluation and Policy Analysis, 1, 2-16.

Great Lakes Area Regional Resource Center. (1995). Michigan information request. Columbus, OH: Great lakes Area Regional Resource Center.

Johnston, J.M. (1989). Teacher perceptions of changes in teaching when they have a small class or an aide. Peabody Journal of Education, 67(1), 106-122.

Johnston, J.M. (1990). Effects of class size on classroom processes and teacher behaviors in kindergarten through third grade. Memphis State University. (ERIC Document Reproduction Service No. ED 321 848)

Keith, P., Keith, T., Young, D., & Fortune, J. (1993). Investigating the influences of class size and class mix on special education student outcomes; Phase One Results. Paper presented at the Annual Meeting of the Eastern Educational Research Association. Clearwater, FL.

MAGI Educational Services. (1995). The New York State special education class size research study. Rye, NY: MAGI Educational Services, Inc.

McGiverin, J., Gilman, D., & Tillitski, C. (1989). A meta-analysis of the relation between class size and achievement. Elementary School Journal, 90(1), 47-56.

Michigan Department of Education, Office of Special Education Services (1996). Report on the staff analysis of the recommendations contained in the special education delivery system task force final report. Lansing, MI: Michigan Department of Education.

Mitchell, D.E., Beach, S.A., & Badarak, G. (1989). Modeling the relationship between achievement and class size: A re-analysis of the Tennessee Project STAR data. Peabody Journal of Education, 67(1), 34-74.

Molnar, A. & Zmrazek, J. (1994). Improving the achievement of Wisconsin's students. Urban initiative task force recommendations and action plan. (Bulletin No. 95079). Madison, WI: Wisconsin Department of Education.

Nye, B.A., Boyd-Zaharias, J., Fulton, B.D., & Wallenhorst, M.R. (1992). Smaller classes are really better. American School Board, 179(5), 31-33.

Odden, A. (1990). Class size and student achievement: Research-based policy alternatives. Educational Evaluation and Policy Analysis, 12(2), 213-227.

Office of Special Education Services (1994). The special education delivery system task force final report. Lansing, MI: Michigan Department of Education.

Pate-Bain, H. & Achilles, C.M. (1986). Interesting developments on class size. Phi Delta Kappan, 67(9), 662-665.

Pate-Bain, H., Achilles, C.M., Boyd-Zaharias, J., & McKenna, B. (1992). Class size does make a difference. Phi Delta Kappan, 74, 253-256.

Pate-Bain, H. & Jacobs, R. (1990). The case for smaller classes and better teachers. Streamlined Seminar, 9(1), 2-5.

Patriarca, L. & Stewart, D.A. (1995). What we know about the effects of class size in special education. Paper presented to the Michigan Department of Education, Office of Special Education Services. Lansing, MI.

Robinson, G.E. (1990). Synthesis of research on the effects of class size. Educational Leadership, 47, 80-90.

Sanogo, Y. & Gilman, D. (1994). Evaluative report: Class size and student achievement: Tennessee's STAR and Indiana's Prime Time Projects. (ERIC Document Reproduction Service No. ED 370 680)

Smith, M.L. & Glass, G.V. (1980). Meta-analysis of research on class size and its relationship to attitudes and instruction. American Educational Research Journal, 17(4), 419-433.

Thurlow, M.L., Ysseldyke, J.E., Wotruba, J.W. & Algozzine, B. (1993). Instruction in special education classrooms under varying student-teacher ratios. Elementary School Journal, 93(3), 305-320.

Virginia Department of Education. (1994). Special Education Program Standards Study: Briefing Report and Draft Recommendations. Richmond, VA: Virginia Department of Education.

Word, E.R., Johnston, J., Pate-Bain, H., Fulton, B.D., Boyd-Zaharias, J., Achilles, C.M., Lintz, M.N., Folger, J., & Breda, D. (1990). The State of Tennessee's student/teacher ratio (STAR) Project: Technical Report 1985-1990. Nashville, TN: Center of Excellence for Research in Basic Skills, Tennessee State University.

Ysseldyke, J.E., Thurlow, M.L., & Wotruba, J.W. (1989). Special education student-teacher ratios for mildly handicapped children. Journal of Special Education, 23(1), 95-106.